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EXAMINER

LEE, JINHEE J

ART UNIT

PAPER NUMBER

2831

DATE MAILED: 06/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/725,836

Applicant(s)

SUN ET AL.

Examiner

Jinhee J Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on 7/8/02. These drawings have addressed all of the examiner's objections, however, the objections on the Notice of Draftsperson's Patent Drawing Review on Form 948 attached to paper number 3 still requires correction.

Claim Objections

2. Claim 16 is objected to because of the following informalities:

Claim 16 line 1, the phrase "to claim 1, the ribbon hinge structure further including:" has grammatical error. Examiner suggests "to claim 1, wherein the ribbon hinge structure further includes:" instead to correct the grammatical error.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5, 9, 10, 15-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the electrical conduction material" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "the electrical conductive material" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim. This limitation is also stated in claim 10 lines 3-4, claim 17 line 2 and claim 18 line 2..

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Claim 15 recites the limitation "the out-of-plane device" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 15 recites the limitation "the horizontal plane" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 16 recites the limitation "the out-of-plane micro-device" in line 9 and in line 10. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-5 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Dhuler et al. (5962949).

Re claim 1, Dhuler et al. discloses a hinge comprising: a silicon-on-insulator wafer including a bottom substrate layer, a middle buried oxide layer and a single crystal silicon device layer (column 10 lines 46-52 according to the numbering in the middle); a ribbon hinge structure (52,54) formed in the device layer of the silicon-on-insulator wafer, wherein the ribbon hinge structure is flexible and capable of movement

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out of the plane of the device layer; and an electrical conductor (56) carried on at least a portion of a surface of the ribbon hinge structure(see figures 4 and 5).

Re claim 2, Dhuler et al. discloses a hinge wherein a micro-device (16 figure 1A) is fabricated from at least a portion of the silicon-on-insulator wafer which has an initial uniform device layer thickness (see column 10 lines 46-52).

Re claim 3, Dhuler et al. discloses a hinge wherein the ribbon hinge structure is configured with a mechanical integrity which permits application of a side-twisting mechanical torque sufficient to twist the ribbon hinge structure to 90° or more from an initial 0° twisted position (XY and Z directions, see abstract).

Re claim 4, Dhuler et al. discloses a hinge wherein the ribbon hinge structure has at least one of a width or thickness which is less than at least one of a width or thickness of the micro-device (see figure 4).

Re claim 5, Dhuler et al. discloses a hinge wherein the ribbon structure has at least one of (i) an isolation region formed within the ribbon structure, and within which is deposited the electrical conduction material, or (ii) an area of insulation material which has been deposited and then patterned on the ribbon structure, wherein conductors can then be placed on top of the insulation material (see figure 4).

Re claim 16, Dhuler et al. discloses a hinge wherein the ribbon hinge structure includes an anchor portion (34 for example) holding one end of the ribbon hinge in a secure position and the ribbon hinge structure configured with a mechanical integrity which permits application of a side-twisting mechanical torque sufficient to twist the ribbon hinge structure to 90° or more from an initial 0° twisted position (XY and Z

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directions, see abstract). The recitation that the anchor portion is formed with an isolation groove, within which is deposited the isolation region of the anchor portion, and an isolation region formed within the ribbon hinge, and within which is deposited the electrical conductive material has not been given patentable weight because the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

7. Claims 6-10, 12, 17 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Moranski et al. (6094289).

Re claim 6, Moranski et al. discloses a micro-assembly comprising: a micro-device formed on or in a device layer of a single crystal silicon substrate (column 16 line 52 according to the numbering in the middle); a ribbon structure (78a for example) formed on or in the device layer, the ribbon structure having been thinned to a thickness which is less than the thickness of the micro-device (see column 8 lines 8-10); a connection interface (unnumbered between 78a and 79a for example) providing a connection point between a first end of the micro-device and a first end of the ribbon structure; and an electrical conductor material (see figure 6) extending along the ribbon structure toward the micro-device (see figures 1, 3a, 6).

Re claim 7, Moranski et al. discloses an anchor portion (unnumbered) holding one end of the ribbon structure in a secure position (see figure 3a).

Re claim 8, Moranski et al. discloses wherein the anchor portion (unnumbered) is formed with an isolation groove, within which is deposited an isolation region of the anchor portion (see figures 3a and 6).

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Re claim 9, Moranski et al. discloses a micro-device includes an isolation region, formed within the micro-device, and in which the electrical conductive material is deposited (see figures 3a and 6).

Re claim 10, Moranski et al. discloses an isolation region formed within the ribbon structure, and within which is deposited the electrical conductive material (see figure 3a, 5 and 6).

Re claim 12, Moranski et al. discloses the ribbon structure with at least one of a width or thickness which is less than at least one of a width or thickness of the micro-device (see figure 3a, 5 and 6).

Re claim 17, Moranski et al. discloses an electronic device in operational connection to the electrical conductor material (see figure 3a and abstract).

Re claim 18, Moranski et al. discloses a power source in connection with the electrical conductor material (see column 5 lines 15-17).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moranski et al. in view of Dhuler et al.

Re claim 11, Moranski et al. substantially discloses the invention as set forth in claim 6 above wherein the device layer is formed as part of a silicon-on-insulator wafer, including at least the device layer. Moranski et al. does not explicitly disclose the invention with oxide layer. However, Dhuler et al. teaches of using the buried oxide layer (see column 10 lines 48-50). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the buried oxide layer of Dhuler et al. on the wafer of Moranski et al. in order to provide support.

Re claim 13, Moranski et al. substantially discloses the invention as set forth in claim 6 above wherein the micro-device is formed from a silicon-on-insulator wafer. Moranski et al. does not explicitly disclose a wafer which has an initial uniform device layer thickness. However, Dhuler et al. teaches of a wafer which has an initial uniform device layer thickness (see column 4 lines 5-12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the initial uniform device layer thickness of Dhuler et al. on the wafer of Moranski et al. in order to provide ease of manufacturing.

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11. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moranski et al.

Re claim 14, Moranski et al. substantially discloses the invention as set forth in claim 6 above with the ribbon structure configured with a mechanical integrity which permits application of a side-twisting mechanical torque to the micro-device sufficient to twist the micro-device (see column 8 lines 8-10). Moranski et al. does not explicitly disclose the ribbon structure is configured with to twist the micro-device to 90 degree or more from an initial 0 degree twisted position. It would have been an obvious matter of design choice to use a ribbon structure configured with a mechanical integrity which permits application of a torque to twist the micro-device to 90 degrees or more, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Re claim 15, Moranski et al. substantially discloses the invention as set forth in claim 6 above with the ribbon structure configured with a mechanical integrity which permits application of a lifting out-of-plane mechanical torque to lift the out-of-plane device (see figures 1 and 3a). Moranski et al. does not explicitly disclose the ribbon structure is configured with to lift the micro-device to 90 degree or more from an initial 0 degree horizontal plane. It would have been an obvious matter of design choice to use a ribbon structure configured with a mechanical integrity which permits application of a torque to lift the micro-device to 90 degrees or more, since such a modification would have involved a mere change in the size of a component. A change in size is generally

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recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Allowable Subject Matter

12. The indicated allowability of claims 6-8 and 11-14 as well as rejected claims 9, 10, 15, 17 and 18 is withdrawn in view of the IDS submitted on 3/3/03.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jinhee J Lee whose telephone number is 703-306-0154. The examiner can normally be reached on Monday-Thursday 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean A Reichard can be reached on 703-308-3682. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

jji
June 17, 2003



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